SEQUENCE LISTING

<110>   Wood, Keith

        Hannah, Rita

        Moravec, Richard A

<120>   IMPROVED METHOD FOR DETECTION OF ATP

<130>   10743/6

<140>   US 09/813,279

<141>   2001-03-19

<150>   US60/269,526

<151>   2001-02-16

<160>   8

<170>   PatentIn version 3.1

<210>   1

<211>   544

<212>   PRT

<213>   Artificial Sequence

<220>

<223>   Mutant of LucPpe2 luciferase

<400>   1

Met Ala Asp Lys Asn Ile Leu Tyr Gly Pro Glu Pro Phe Tyr Pro Leu

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Ala Asp Gly Thr Ala Gly Glu Gln Met Phe Asp Ala Leu Ser Arg Tyr
             20                  25                  30

Ala Asp Ile Ser Gly Cys Ile Ala Leu Thr Asn Ala His Thr Lys Glu
             35              40                  45

Asn Val Leu Tyr Glu Glu Phe Leu Lys Leu Ser Cys Arg Leu Ala Glu
         50                  55                  60

Ser Phe Lys Lys Tyr Gly Leu Lys Gln Asn Asp Thr Ile Ala Val Cys
65                  70                  75                      80

Ser Glu Asn Gly Leu Gln Phe Phe Leu Pro Val Ile Ala Ser Leu Tyr
                 85                  90                  95

Leu Gly Ile Ile Ala Ala Pro Val Ser Asp Lys Tyr Ile Glu Arg Glu
                 100             105                 110

Leu Ile His Ser Leu Gly Ile Val Lys Pro Arg Ile Ile Phe Cys Ser
             115                 120                 125

Lys Asn Thr Phe Gln Lys Val Leu Asn Val Lys Ser Lys Leu Lys Ser
         130                 135                 140

Val Glu Thr Ile Ile Ile Leu Asp Leu Asn Glu Asp Leu Gly Gly Tyr
145                 150                 155                     160

Gln Cys Leu Asn Asn Phe Ile Ser Gln Asn Ser Asp Ser Asn Leu Asp
                 165                 170                 175

Val Lys Lys Phe Lys Pro Tyr Ser Phe Asn Arg Asp Asp Gln Val Ala
                 180                 185                 190

Leu Val Met Phe Ser Ser Gly Thr Thr Gly Val Pro Lys Gly Val Met
                 195                 200                 205

Leu Thr His Lys Asn Ile Val Ala Arg Phe Ser Leu Ala Lys Asp Pro
         210                 215                 220

Thr Phe Gly Asn Ala Ile Asn Pro Thr Thr Ala Ile Leu Thr Val Ile
225                 230                 235                     240
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Pro Phe His His Gly Phe Gly Met Met Thr Thr Leu Gly Tyr Phe Thr
            245             250             255

Cys Gly Phe Arg Val Val Leu Met His Thr Phe Glu Glu Lys Leu Phe
            260             265             270

Leu Gln Ser Leu Gln Asp Tyr Lys Val Glu Ser Thr Leu Leu Val Pro
            275             280             285

Thr Leu Met Ala Phe Leu Ala Lys Ser Ala Leu Val Glu Lys Tyr Asp
    290             295             300

Leu Ser His Leu Lys Glu Ile Ala Ser Gly Gly Ala Pro Leu Ser Lys
305             310             315             320

Glu Ile Gly Glu Met Val Lys Lys Arg Phe Lys Leu Asn Phe Val Arg
            325             330             335

Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Val Leu Ile Thr Pro
            340             345             350

Lys Gly Asp Ala Arg Pro Gly Ser Thr Gly Lys Ile Val Pro Phe His
            355             360             365

Ala Val Lys Val Val Asp Pro Thr Thr Gly Lys Ile Leu Gly Pro Asn
    370             375             380

Glu Pro Gly Glu Leu Tyr Phe Lys Gly Ala Met Ile Met Lys Gly Tyr
385             390             395             400

Tyr Asn Asn Glu Glu Ala Thr Lys Ala Ile Ile Asp Asn Asp Gly Trp
            405             410             415

Leu Arg Ser Gly Asp Ile Ala Tyr Tyr Asp Asn Asp Gly His Phe Tyr
            420             425             430

Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln Val
            435             440             445

Ala Pro Ala Glu Ile Glu Gly Ile Leu Leu Gln His Pro Tyr Ile Val
450             455             460
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Ser Glu Asn Gly Leu Gln Phe Phe Leu Pro Val Ile Ala Ser Leu Tyr
             85   90   95

Leu Gly Ile Ile Val Ala Pro Val Asn Asp Lys Tyr Ile Glu Arg Glu
          100   105   110

Leu Ile His Ser Leu Gly Ile Val Lys Pro Arg Ile Val Phe Cys Ser
          115   120   125

Lys Asn Thr Phe Gln Lys Val Leu Asn Val Lys Ser Lys Leu Lys Ser
          130   135   140

Ile Glu Thr Ile Ile Ile Leu Asp Leu Asn Glu Asp Leu Gly Gly Tyr
145   150   155   160

Gln Cys Leu Asn Asn Phe Ile Ser Gln Asn Ser Asp Ser Asn Leu Asp
           165   170   175

Val Lys Lys Phe Lys Pro Tyr Ser Phe Asn Arg Asp Asp Gln Val Ala
           180   185   190

Leu Ile Met Phe Ser Ser Gly Thr Thr Gly Leu Pro Lys Gly Val Met
          195   200   205

Leu Thr His Lys Asn Ile Val Ala Arg Phe Ser Leu Ala Lys Asp Pro
          210   215   220

Thr Phe Gly Asn Ala Ile Asn Pro Thr Thr Ala Ile Leu Thr Val Ile
225   230   235   240

Pro Phe His His Gly Phe Gly Met Met Thr Thr Leu Gly Tyr Phe Thr
          245   250   255

Cys Gly Phe Arg Val Val Leu Met His Thr Phe Glu Glu Lys Leu Phe
          260   265   270

Leu Gln Ser Leu Gln Asp Tyr Lys Val Glu Ser Thr Leu Leu Val Pro
          275   280   285

Thr Leu Met Ala Phe Leu Ala Lys Ser Ala Leu Val Glu Lys Tyr Asp
          290   295   300

Leu Ser His Leu Lys Glu Ile Ala Ser Gly Gly Ala Pro Leu Ser Lys

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          305                    310                    315                    320

    Glu Ile Gly Glu Met Val Lys Lys Arg Phe Lys Leu Asn Phe Val Arg
                    325                 330                 335

    Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Val Leu Ile Thr Pro
                    340                 345                 350

    Lys Gly Asp Ala Lys Pro Gly Ser Thr Gly Lys Ile Val Pro Phe His
                    355                 360                 365

    Ala Val Lys Val Val Asp Pro Thr Thr Gly Lys Ile Leu Gly Pro Asn
            370                 375                 380

    Glu Pro Gly Glu Leu Tyr Phe Lys Gly Pro Met Ile Met Lys Gly Tyr
    385                 390                 395                 400

    Tyr Asn Asn Glu Glu Ala Thr Lys Ala Ile Ile Asp Asn Asp Gly Trp
                    405                 410                 415

    Leu Arg Ser Gly Asp Ile Ala Tyr Tyr Asp Asn Asp Gly His Phe Tyr
                    420                 425                 430

    Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln Val
                435                 440                 445

    Ala Pro Ala Glu Ile Glu Gly Ile Leu Leu Gln His Pro Tyr Ile Val
            450                 455                 460

    Asp Ala Gly Val Thr Gly Ile Pro Asp Glu Ala Ala Gly Glu Leu Pro
    465                 470                 475                 480

    Ala Ala Gly Val Val Val Gln Thr Gly Lys Tyr Leu Asn Glu Gln Ile
                485                 490                 495

    Val Gln Asp Tyr Val Ala Ser Gln Val Ser Thr Ala Lys Trp Leu Arg
                500                 505                 510

    Gly Gly Val Lys Phe Leu Asp Glu Ile Pro Lys Gly Ser Thr Gly Lys
                515                 520                 525

    Ile Asp Arg Lys Val Leu Arg Gln Met Phe Glu Lys His Thr Asn Gly
            530                 535                 540
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<210> 3

<211> 544

<212> PRT

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

<400> 3

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Met Ala Asp Lys Asn Ile Leu Tyr Gly Pro Glu Pro Phe Tyr Pro Leu
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Glu Asp Gly Thr Ala Gly Glu Gln Met Phe Asp Ala Leu Ser Arg Tyr
            20              25              30


Ala Asp Ile Pro Gly Cys Ile Ala Leu Thr Asn Ala His Thr Lys Glu
        35              40              45


Asn Val Leu Tyr Glu Glu Phe Leu Lys Leu Ser Cys Arg Leu Ala Glu
    50              55              60


Ser Phe Lys Lys Tyr Gly Leu Lys Gln Asn Asp Thr Ile Ala Val Cys
65              70              75              80


Ser Glu Asn Ser Leu Gln Phe Phe Leu Pro Val Ile Ala Ser Leu Tyr
            85              90              95


Leu Gly Ile Ile Val Ala Pro Val Asn Asp Lys Tyr Ile Glu Arg Glu
            100             105             110


Leu Ile His Ser Leu Gly Ile Val Lys Pro Arg Ile Val Phe Cys Ser
        115             120             125


Lys Asn Thr Phe Gln Lys Val Leu Asn Val Lys Ser Lys Leu Lys Ser
    130             135             140


Ile Glu Thr Ile Ile Ile Leu Asp Leu Asn Asp Asp Leu Gly Gly Tyr
145             150             155             160
```

Gln Cys Leu Asn Asn Phe Ile Ser Gln Asn Ser Asp Ser Asn Leu Asp
              165   170   175

Val Lys Lys Phe Lys Pro Tyr Ser Phe Asn Arg Asp Asp Gln Val Ala
              180   185   190

Leu Ile Met Phe Ser Ser Gly Thr Thr Gly Leu Pro Lys Gly Val Met
              195   200   205

Leu Thr His Lys Asn Ile Val Ala Arg Phe Ser Ile Ala Lys Asp Pro
      210   215   220

Thr Phe Gly Asn Ala Ile Asn Pro Thr Ser Ala Ile Leu Thr Val Ile
225   230   235   240

Pro Phe His His Gly Phe Gly Met Met Thr Thr Leu Gly Tyr Phe Thr
              245   250   255

Cys Gly Phe Arg Val Val Leu Met His Thr Phe Glu Glu Lys Leu Phe
              260   265   270

Leu Gln Ser Leu Gln Asp Tyr Lys Val Glu Ser Thr Leu Leu Val Pro
              275   280   285

Thr Leu Met Ala Phe Leu Ala Lys Ser Ala Leu Val Glu Lys Tyr Asp
      290   295   300

Leu Ser His Leu Lys Glu Ile Ala Ser Gly Gly Ala Pro Leu Ser Lys
305   310   315   320

Glu Ile Gly Glu Met Val Lys Lys Arg Phe Lys Leu Asn Phe Val Arg
              325   330   335

Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Val Leu Ile Thr Pro
              340   345   350

Lys Gly Asp Ala Lys Pro Gly Ser Thr Gly Lys Ile Val Pro Phe His
      355   360   365

Ala Val Lys Val Val Asp Pro Thr Thr Gly Lys Ile Leu Gly Pro Asn
      370   375   380

```
Glu Pro Gly Glu Leu Tyr Phe Lys Gly Pro Met Ile Met Lys Gly Tyr
385             390             395             400

Tyr Asn Asn Glu Glu Ala Thr Lys Ala Ile Ile Asp Asn Asp Gly Trp
            405             410             415

Leu Arg Ser Gly Asp Ile Ala Tyr Tyr Asp Asn Asp Gly His Phe Tyr
            420             425             430

Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln Val
        435             440             445

Ala Pro Ala Glu Ile Glu Gly Ile Leu Leu Gln His Pro Tyr Ile Val
    450             455             460

Asp Ala Gly Val Thr Gly Ile Pro Asp Glu Ala Ala Gly Glu Leu Pro
465             470             475             480

Ala Ala Gly Val Val Val Gln Thr Gly Lys Tyr Leu Asn Glu Gln Ile
            485             490             495

Val Gln Asp Tyr Val Ala Ser Gln Val Ser Thr Ala Lys Trp Leu Arg
            500             505             510

Gly Gly Val Ile Phe Leu Asp Glu Ile Pro Lys Gly Ser Thr Gly Lys
        515             520             525

Ile Asp Arg Lys Val Leu Arg Gln Met Leu Glu Lys His Thr Asn Gly
    530             535             540
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<210> 4

<211> 544

<212> PRT

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

<400> 4

Met Ala Asp Lys Asn Ile Leu Tyr Gly Pro Glu Pro Phe Tyr Pro Leu

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1                5                          10                         15

Glu Asp Gly Thr Ala Gly Glu Gln Met Phe Asp Ala Leu Ser Arg Tyr
            20                  25                  30

Ala Ala Ile Pro Gly Cys Ile Ala Leu Thr Asn Ala His Thr Lys Glu
            35                  40                  45

Asn Val Leu Tyr Glu Glu Phe Leu Lys Leu Ser Cys Arg Leu Ala Glu
            50                  55                  60

Ser Phe Lys Lys Tyr Gly Leu Lys Gln Asn Asp Thr Ile Ala Val Cys
65                  70                  75                  80

Ser Glu Asn Ser Leu Gln Phe Phe Leu Pro Val Ile Ala Ser Leu Tyr
                85                  90                  95

Leu Gly Ile Ile Val Ala Pro Val Asn Asp Lys Tyr Ile Glu Arg Glu
            100                 105                 110

Leu Ile His Ser Leu Gly Ile Val Lys Pro Arg Ile Val Phe Cys Ser
            115                 120                 125

Lys Asn Thr Phe Gln Lys Val Leu Asn Val Lys Ser Lys Leu Lys Ser
            130                 135                 140

Ile Glu Thr Ile Ile Ile Leu Asp Leu Asn Glu Asp Leu Gly Gly Tyr
145                 150                 155                 160

Gln Cys Leu Asn Asn Phe Ile Ser Gln Asn Ser Asp Ser Asn Leu Asp
                165                 170                 175

Val Lys Lys Phe Lys Pro Tyr Ser Phe Asn Arg Asp Asp Gln Val Ala
            180                 185                 190

Ser Ile Met Phe Ser Ser Gly Thr Thr Gly Leu Pro Lys Gly Val Met
            195                 200                 205

Leu Thr His Lys Asn Ile Val Ala Arg Phe Ser Ile Ala Lys Asp Pro
            210                 215                 220

Thr Phe Gly Asn Ala Ile Asn Pro Thr Ser Ala Ile Leu Thr Val Ile
225                 230                 235                 240
```

Pro Phe His His Gly Phe Gly Met Met Thr Thr Leu Gly Tyr Phe Thr
            245   250   255

Cys Gly Phe Arg Val Val Leu Met His Thr Phe Glu Glu Lys Leu Phe
            260   265   270

Leu Gln Ser Leu Gln Asp Tyr Lys Val Glu Ser Thr Leu Leu Val Pro
            275   280   285

Thr Leu Met Ala Phe Leu Ala Lys Ser Ala Leu Val Glu Lys Tyr Asp
    290   295   300

Leu Ser His Leu Lys Glu Ile Ala Ser Gly Gly Ala Pro Leu Ser Lys
305   310   315   320

Glu Ile Gly Glu Met Val Lys Lys Arg Phe Lys Leu Asn Phe Val Arg
                325   330   335

Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Val Leu Ile Thr Pro
            340   345   350

Lys Gly Asp Ala Lys Pro Gly Ser Thr Gly Lys Ile Val Pro Leu His
            355   360   365

Ala Val Lys Val Val Asp Pro Thr Thr Gly Lys Ile Leu Gly Pro Asn
    370   375   380

Glu Pro Gly Glu Leu Tyr Phe Lys Gly Pro Met Ile Met Lys Gly Tyr
385   390   395   400

Tyr Asn Asn Glu Glu Ala Thr Lys Ala Ile Ile Asp Asn Asp Gly Trp
            405   410   415

Leu Arg Ser Gly Asp Ile Ala Tyr Tyr Asp Asn Asp Gly His Phe Tyr
            420   425   430

Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln Val
            435   440   445

Ala Pro Ala Glu Ile Glu Gly Ile Leu Leu Gln His Pro Tyr Ile Val
    450   455   460

```
Asp Ala Gly Val Thr Gly Ile Pro Asp Glu Ala Ala Gly Glu Leu Pro
465             470         475             480
```

```
Ala Ala Gly Val Val Val Gln Thr Gly Lys Tyr Leu Asn Glu Gln Ile
            485             490             495
```

```
Val Gln Asp Tyr Val Ala Ser Gln Val Ser Thr Ala Lys Trp Leu Arg
            500             505             510
```

```
Gly Gly Val Lys Phe Leu Asp Glu Ile Pro Lys Gly Ser Thr Gly Lys
            515             520             525
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Ile Asp Arg Lys Val Leu Arg Gln Met Leu Glu Lys His Thr Asn Gly
        530             535             540
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<210> 5

<211> 1639

<212> DNA

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

<400> 5

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catagcattg acaaatgctc atacaaaaga aaatgtttta tatgaagagt ttttaaaatt   180

gtcgtgtcgt ttagcggaaa gttttaaaaa gtatggatta aaacaaaacg acacaatagc   240

ggtgtgtagc gaaaatggtt tgcaattttt ccttcctgta attgcatcat tgtatcttgg   300

aataattgca gcacctgtta gtgataaata cattgaacgt gaattaatac acagtcttgg   360

tattgtaaaa ccacgcataa tttttttgctc caagaatact tttcaaaaag tactgaatgt   420

aaaatctaaa ttaaaatctg tagaaactat tattatatta gacttaaatg aagacttagg   480

aggttatcaa tgcctcaaca actttatttc tcaaaattcc gatagtaatc tggacgtaaa   540

aaaatttaaa ccatattctt ttaatcgaga cgatcaggtt gcgttggtaa tgtttttctcc   600

tggtacaact ggtgttccga agggagtcat gctaactcac aagaatattg ttgcacgatt   660
```

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ttctcttgca aaagatccta cttttggtaa cgcaattaat cccacgacag ceattttaac      720

ggtaatacct ttccaccatg gttttggtat gatgaccaca ttaggatact ttacttgtgg      780

attccgagtt gttctaatgc acacgtttga agaaaaacta tttctacaat cattacaaga      840

ttataaagtg gaaagtactt tacttgtacc aacattaatg gcatttcttg caaaaagtgc      900

attagttgaa aagtacgatt tatcgcactt aaaagaaatt gcatctggtg gcgcaccttt      960

atcaaaagaa attgggggaga tggtgaaaaa acggtttaaa ttaaactttg tcaggcaagg     1020

gtatggatta acagaaacca cttcggctgt tttaattaca ccgaaaggtg acgccagacc     1080

gggatcaact ggtaaaatag taccatttca cgctgttaaa gttgtcgatc ctacaacagg     1140

aaaaattttg gggccaaatg aacctggaga attgtatttt aaaggcgcca tgataatgaa     1200

gggttattat aataatgaag aagctactaa agcaattatt gataatgacg gatggttgcg     1260

ctctggtgat attgcttatt atgacaatga tggccatttt tatattgtgg acaggctgaa     1320

gtcattaatt aaatataaag gttatcaggt tgcacctgct gaaattgagg gaatactctt     1380

acaacatccg tatattgttg atgccggcgt tactggtata ccggatgaag ccgcgggcga     1440

gcttccagct gcaggtgttg tagtacagac tggaaaatat ctaaacgaac aaatcgtaca     1500

agattttgtt tccagtcaag tttcaacagc caaatggcta cgtggtgggg tgaaattttt     1560

ggatgaaatt cccaaaggat caactggaaa aattgacaga aaagtgttaa gacaaatgtt     1620

tgaaaaacac accaatggg                                                   1639
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<210> 6

<211> 1639

<212> DNA

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

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tgggacggct ggagaacaga tgtttgacgc attatctcgt tatgcagata ttccgggctg      120

catagcattg acaaatgctc atacaaaaga aaatgtttta tatgaagagt ttctgaaact      180
```

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gtcgtgtcgt ttagcggaaa gttttaaaaa gtatggatta aaacaaaacg acacaatagc    240

ggtgtgtagc gaaaatggtc tgcaattttt ccttcctgta attgcatcat tgtatcttgg    300

aataattgtg gcacctgtta acgataaata cattgaacgt gaattaatac acagtcttgg    360

tattgtaaaa ccacgcatag tttttttgctc caagaatact tttcaaaaag tactgaatgt    420

aaaatctaaa ttaaaatcta ttgaaactat tattatatta gacttaaatg aagacttagg    480

aggttatcaa tgcctcaaca actttatttc tcaaaattcc gatagtaatc tggacgtaaa    540

aaaatttaaa ccatattctt ttaatcgaga cgatcaggtt gcgttgatta tgttttcttc    600

tggtacaact ggtctgccga agggagtcat gctaactcac aagaatattg ttgcacgatt    660

ttctcttgca aaagatccta cttttggtaa cgcaattaat cccacgacag caattttaac    720

ggtaatacct ttccaccatg gttttggtat gatgaccaca ttaggatact ttacttgtgg    780

attccgagtt gttctaatgc acacgtttga agaaaaacta tttctacaat cattacaaga    840

ttataaagtg gaaagtactc tacttgtacc aacattaatg gcatttcttg caaaaagtgc    900

attagttgaa aagtacgatt tatcgcactt aaaagaaatt gcatctggtg gcgcaccttt    960

atcaaaagaa attggggaga tggtgaaaaa acggtttaaa ttaaactttg tcaggcaagg   1020

gtatggatta acagaaacca cttcggctgt tttaattaca ccgaaaggtg acgccaaacc   1080

gggatcaact ggtaaaatag taccatttca cgctgttaaa gttgtcgatc ctacaacagg   1140

aaaaattttg gggccaaatg aacctggaga attgtatttt aaaggcccga tgataatgaa   1200

gggttattat aataatgaag aagctactaa agcaattatt gataatgacg gatggttgcg   1260

ctctggtgat attgcttatt atgacaatga tggccatttt tatattgtgg acaggctgaa   1320

gtcactgatt aaatataaag gttatcaggt tgcacctgct gaaattgagg gaatactctt   1380

acaacatccg tatattgttg atgccggcgt tactggtata ccggatgaag ccgcgggcga   1440

gcttccagct gcaggtgttg tagtacagac tggaaaatat ctaaacgaac aaatcgtaca   1500

agattatgtt gccagtcaag tttcaacagc caaatggcta cgtggtgggg tgaaattttt   1560

ggatgaaatt cccaaaggat caactggaaa aattgacaga aaagtgttaa gacaaatgtt   1620

tgaaaaacac accaatggg                                                1639
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<210>   7

<211>   1639

<212>   DNA

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

<400> 7

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tgggacggct ggagaacaga tgtttgacgc attatctcgt tatgcagata ttccgggctg     120

catagcattg acaaatgctc atacaaaaga aaatgtttta tatgaagagt ttctgaaact     180

gtcgtgtcgt ttagcggaaa gttttaaaaa gtatggatta aaacaaaacg acacaatagc     240

ggtgtgtagc gaaaatagtc tgcaattttt ccttcctgta attgcatcat tgtatcttgg     300

aataattgtg gcacctgtta acgataaata cattgaacgt gaattaatac acagtcttgg     360

tattgtaaaa ccacgcatag ttttttgctc caagaatact tttcaaaaag tactgaatgt     420

aaaatctaaa ttaaaatcta ttgaaactat tattatatta gacttaaatg atgacttagg     480

aggttatcaa tgcctcaaca actttatttc tcaaaattcc gatagtaatc tggacgtaaa     540

aaaatttaaa ccatattctt ttaatcgaga cgatcaggtt gcgttgatta tgttttcttc     600

tggtacaact ggtctgccga agggagtcat gctaactcac aagaatattg ttgcacgatt     660

ttctattgca aaagatccta cttttggtaa cgcaattaat cccacgtcag caattttaac     720

ggtaatacct ttccaccatg gttttggtat gatgaccaca ttaggatact ttacttgtgg     780

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ttataaagtg gaaagtactt tacttgtacc aacattaatg gcatttcttg caaaaagtgc     900

attagttgaa aagtacgatt tatcgcactt aaaagaaatt gcatctggtg gcgcaccttt     960

atcaaaagaa attggggaga tggtgaaaaa acggtttaaa ttaaactttg tcaggcaagg    1020

gtatggatta acagaaacca cttcggctgt tttaattaca ccgaaaggtg acgccaaacc    1080

gggatcaact ggtaaaatag taccatttca cgctgttaaa gttgtcgatc ctacaacagg    1140

aaaaattttg gggccaaatg aacctggaga attgtatttt aaaggcccga tgataatgaa    1200

gggttattat aataatgaag aagctactaa agcaattatt gataatgacg gatggttgcg    1260

ctctggtgat attgcttatt atgacaatga tggccatttt tatattgtgg acaggctgaa    1320

gtcactgatt aaatataaag gttatcaggt tgcaccagct gaaattgagg gaatactctt    1380

acaacatccg tatattgttg atgccggcgt tactggtata ccggatgaag ccgcgggcga    1440
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gcttccagct gcaggtgttg tagtacagac tggaaaatat ctaaacgaac aaatcgtaca   1500

agattatgtt gccagtcaag tttcaacagc caaatggcta cgtggtgggg tgatattttt   1560

ggatgaaatt cccaaaggat caactggaaa aattgacaga aaagtgttaa gacaaatgtt   1620

agaaaaacac accaatggg                                                1639
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<210> 8

<211> 1639

<212> DNA

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

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tgggacggct ggagaacaga tgtttgacgc attatctcgt tatgcagcta ttccgggctg    120

catagcattg acaaatgctc atacaaaaga aaatgtttta tatgaagagt ttctgaaact    180

gtcgtgtcgt ttagcggaaa gttttaaaaa gtatggatta aaacaaaacg acacaatagc    240

ggtgtgtagc gaaaatagtc tgcaattttt ccttcctgta attgcatcat tgtatcttgg    300

aataattgtg gcacctgtta acgataaata cattgaacgt gaattaatac acagtcttgg    360

tattgtaaaa ccacgcatag tttttttgctc caagaatact tttcaaaaag tactgaatgt    420

aaaatctaaa ttaaaatcta ttgaaactat tattatatta gacttaaatg aagacttagg    480

aggttatcaa tgcctcaaca actttatttc tcaaaattcc gatagtaatc tggacgtaaa    540

aaaatttaaa ccctattctt ttaatcgaga cgatcaggtt gcgtcgatta tgttttcttc    600

tggtacaact ggtctgccga agggagtcat gctaactcac aagaatattg ttgcacgatt    660

ttctattgca aaagatccta cttttggtaa cgcaattaat cccacgtcag caattttaac    720

ggtaatacct ttccaccatg gttttggtat gatgaccaca ttaggatact ttacttgtgg    780

attccgagtt gttctaatgc acacgtttga agaaaaacta tttctacaat cattacaaga    840

ttataaagtg gaaagtactt tacttgtacc aacattaatg gcatttcttg caaaaagtgc    900

attagttgaa aagtacgatt tatcgcactt aaaagaaatt gcatctggtg gcgcaccttt    960

atcaaaagaa attggggaga tggtgaaaaa acggtttaaa ttaaactttg tcaggcaagg   1020
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gtatggatta acagaaacca cttcggctgt tttaattaca ccgaaaggtg acgccaaacc   1080

gggatcaact ggtaaaatag taccattaca cgctgttaaa gttgtcgatc ctacaacagg   1140

aaaaattttg gggccaaatg aacctggaga attgtatttt aaaggcccga tgataatgaa   1200

gggttattat aataatgaag aagctactaa agcaattatt gataatgacg gatggttgcg   1260

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gcttccagct gcaggtgttg tagtacagac tggaaaatat ctaaacgaac aaatcgtaca   1500

agattatgtt gccagtcaag tttcaacagc caaatggcta cgtggtgggg tgaaattttt   1560

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agaaaaacac accaatggg                                                1639
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